ABSTRACT OF THE DISCLOSURE

A hand-held microwave system for intra-oral dentistry utilizes microwave energy to cure polymer materials intra-orally so as to produce dental composites having improved physical characteristics, and also utilizes microwave energy to detect the presence of and to preferentially heat caries or cavities, thereby disinfecting and therapeutically treating the caries in a potentially non-invasive manner. The intra-oral polymerization process can be accomplished with less overall energy and with composite-matrices that maximally absorb the microwave energy so as to reduce heating of adjacent tissue. The antenna of a hand-held version of the intra-oral microwave system is also advantageously designed to detect the presence of and to preferentially heat caries or cavities, thereby disinfecting and therapeutically treating the caries in a potentially non-invasive manner. A method and product by process for the system are also disclosed.